

What is Claimed is:

1. A non-contact fluid deposition device, said device comprising:
  - (a) a non-contact fluid deposition printhead adjuster comprising:
    - (i) a single rigid frame;
    - (ii) at least one printhead housing; and
    - (iii) a set of axis adjustment elements comprising at least one horizontal adjustment element and a vertical adjustment element, where said set further includes a rotational axis adjustment element for each horizontal and vertical axis adjustment element of said set; and
  - (b) a movement arm rigidly attached to said frame of said adjuster for moving said adjuster, and any printheads operationally attached thereto, relative to a printing substrate.
2. The device according to Claim 1, wherein said set of axis adjustment elements comprises six multiple axis adjustment elements which include two horizontal axis adjustment elements, one vertical axis adjustment element and a rotational axis adjustment element for each of said horizontal and vertical axis adjustment elements.
3. The device according to Claim 2, wherein said six axis adjustment elements are: X axis adjustment element; theta about X axis adjustment element; Y axis adjustment element; theta about Y axis adjustment element; Z axis adjustment element; and theta about Z axis adjustment element.
4. The device according to Claim 1, wherein each axis adjustment element comprises a fine pitch screw.
5. The device according to Claim 1, wherein said printhead housing is held in said frame by at least one substantially frictionless screw/spring holding element that holds said housing relative to said frame in a manner that allows movement of said housing without sliding friction from said spring component of said holding element

6. The device according to Claim 5, wherein said screw of said holding element has an outer diameter that is smaller than the inner diameter of said spring.

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7. The device according to Claim 1, wherein said adjuster comprises multiple printhead housings each having its own set of axis adjustment elements.

8. The device according to Claim 7, wherein said adjuster comprises two printhead housings.

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9. The device according to Claim 1, wherein each printhead housing of said adjuster comprises an alignment element for precisely aligning a printhead placed therein.

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10. The device according to Claim 1, wherein said device comprises a detector to capture an image of the drops after use of the device in fluid deposition.

11. The device according to Claim 1, wherein said housing comprises a compression element for establishing a fluid seal between an external fluid line and a printhead in said housing.

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12. The device according to Claim 11, wherein said compression element comprises an engaging screw.

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13. The device according to Claim 1, wherein said housing comprises a compression element for establishing electrical connection between a printhead in said housing and an electrical connector board in said housing.

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14. The device according to Claim 14, wherein said compression means is a thumb screw.

15. The device according to claim 1, wherein a printhead is present in said at least one printhead housing.

5 16. The device according to Claim 15, wherein said printhead is a pulse jet printhead.

17. The device according to Claim 16, wherein said printhead is part of a multiple die, multiple reservoir printhead assembly.

10 18. The device according to Claim 17, wherein said printhead comprises at least one firing chamber containing a volume of a fluid that includes a biopolymer or precursor thereof.

19. A non-contact fluid deposition device, said device comprising:

- 15 (a) a non-contact fluid deposition printhead adjuster comprising:
- (i) a single rigid frame;
  - (ii) two individual printhead housings held in side-by-side configuration in said single rigid frame; and
  - (iii) a set of axis adjustment elements comprising at least one
- 20 horizontal adjustment element and a vertical adjustment element, where said set further includes a rotational axis adjustment element for each horizontal and vertical axis adjustment element of said set; and
- (b) a movement arm rigidly attached to said frame of said adjuster for
- 25 moving said adjuster, and any printheads operationally attached thereto, relative to a printing substrate.

20. The device according to Claim 19, wherein each of said housings is held in said single rigid frame by six axis adjustment elements which include two

30 horizontal axis adjustment elements, one vertical axis adjustment element and a rotational axis adjustment element for each of said horizontal and vertical axis adjustment elements.

21. The device according to Claim 20, wherein said six axis adjustment elements are: X axis adjustment element; theta about X axis adjustment element; Y axis adjustment element; theta about Y axis adjustment element; Z axis adjustment element; and theta about Z axis adjustment element.

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22. The device according to Claim 19, wherein each axis adjustment element comprises a fine pitch screw.

23. The device according to Claim 22, wherein each of said printhead housings is held in said frame by at least one substantially frictionless screw/spring holding element that holds said housing relative to said frame in a manner that allows movement of said housing without sliding friction from said spring component of said holding element

24. The device according to Claim 23, wherein said screw of said holding element has an outer diameter that is smaller than the inner diameter of said spring.

25. The device according to Claim 19, wherein each printhead housing of said adjuster comprises an alignment element for precisely aligning a printhead placed therein.

26. The device according to Claim 25, wherein said aligning element comprises at least two dowel pins.

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27. The device according to Claim 19, wherein said housings each comprise a compression element for establishing a fluid seal between an external fluid line and a printhead in said housing.

28. The device according to Claim 27, wherein said compression element comprises an engaging screw.

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29. The device according to Claim 19, wherein said housings each comprise a compression element for establishing electrical connection between a printhead in said housing and an electrical connector board in said housing.

5 30. The device according to Claim 29, wherein said compression means is a thumb screw.

31. The device according to Claim 19, wherein a printhead is present in each of said printhead housings.

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32. The device according to Claim 31, wherein said printhead is a thermal pulse jet printhead.

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33. The device according to Claim 32, wherein said printhead is part of a multiple die, multiple reservoir printhead assembly.

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34. The device according to Claim 33, wherein said printhead comprises at least one firing chamber containing a volume of a fluid that includes a biopolymer or precursor thereof.

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35. A method of depositing a volume of a fluid on a surface of a substrate, said method comprising:

(a) positioning a printhead comprising adjuster of a device according to Claim 1 in opposing relation to said substrate surface; and

(b) actuating said printhead to expel a volume of said fluid onto said substrate surface.

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36. The method according to Claim 35, wherein said fluid contains a biopolymer or precursor thereof.

37. The method according to Claim 36, wherein said method further comprises depositing a volume of a second fluid containing a biopolymer or precursor thereof onto said substrate surface.

38. The method according to Claim 35, wherein said method is a method of making a biopolymer array.

39. The method according to Claim 38, wherein said biopolymer is selected  
5 from the group consisting of polypeptides and nucleic acids.

40. The method according to Claim 37, wherein said precursor is selected from the group consisting of amino acids and nucleotides.

10 41. A biopolymeric array produced according to the method of Claim 38.

42. A method of detecting the presence of an analyte in a sample, said method comprising:

(a) contacting (i) a biopolymeric array according to Claim 41 having a  
15 polymeric ligand that specifically binds to said analyte, with (ii) a sample suspected of comprising said analyte under conditions sufficient for binding of said analyte to a biopolymeric ligand on said array to occur; and

(b) detecting the presence of binding complexes on the surface of the  
20 said array to obtain assay data which is employed to detect the presence of said analyte in said sample.

43. The method according to Claim 42, wherein said method further comprises a data transmission step in which a result from a reading of the array is transmitted from a first location to a second location.

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44. A method according to Claim 43 wherein said second location is a remote location.

30 45. A method comprising receiving data representing a result of a reading obtained by the method of Claim 42.

46. A kit for use in an assay that employs an array, said kit comprising:  
an array according to claim 41; and

instructions for using said array in an analyte detection assay according to Claim 42.

47. An automated non-contact printing system, said system comprising a printhead loaded device according to Claim 15, wherein said printhead loaded device comprises a fluid.

48. The system according to Claim 47, wherein said fluid comprises a biopolymer or a precursor thereof.

49. A non-contact fluid deposition printhead adjuster comprising:  
(a) a single rigid frame;  
(b) at least one printhead housing; and  
(c) and a set of axis adjustment elements comprising a rotational axis adjustment element for each horizontal and/or vertical axis adjustment element of said set;.

50. The adjuster according to Claim 49, wherein said set of axis adjustment elements comprises six axis adjustment elements.

51. The adjuster according to Claim 50, wherein said six axis adjustment elements are: X axis adjustment element; theta about X axis adjustment element; Y axis adjustment element; theta about Y axis adjustment element; Z axis adjustment element; and theta about Z axis adjustment element.

52. The adjuster according to Claim 49, wherein each axis adjustment element comprises a fine pitch screw.

53. The adjuster according to Claim 49, wherein said printhead housing is held in said frame by at least one substantially frictionless screw/spring holding element that holds said housing relative to said frame in a manner that allows movement of said housing without sliding friction from said spring component of said holding element

54. The adjuster according to Claim 53, wherein said screw has an outer diameter that is smaller than the inner diameter of said spring.

55. The adjuster according to Claim 49, wherein said adjuster comprises  
5 multiple printhead housings each having its own set of axis adjustment elements.

56. The adjuster according to Claim 55, wherein said adjuster comprises two printhead housings.

10 57. The adjuster according to Claim 49, wherein each printhead housing of said adjuster comprises an alignment element for precisely aligning a printhead placed therein.

15 58. The adjuster according to Claim 57, wherein said aligning element comprises at least two dowel pins.

59. The adjuster according to Claim 49, wherein said housing comprises a compression element for establishing a fluid seal between an external fluid line and a printhead in said housing.

20 60. The adjuster according to Claim 59, wherein said compression element comprises an engaging screw.

25 61. The adjuster according to Claim 49, wherein said housing comprises a compression element for establishing electrical connection between a printhead in said housing and an electrical connector board in said housing.

62. The adjuster according to Claim 61, wherein said compression means is a thumb screw.

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